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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
WILLIAMS, LAWRENCE B	

ART UNIT	PAPER NUMBER
2634	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/552,150	VANDENAMEELE, PATRICK	
	Examiner	Art Unit	
	Lawrence B Williams	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 April 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show items as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Note: Examiner suggests applicant label items in Figs. 1 and 2 as referenced in specification.

Specification

3. The disclosure is objected to because of the following informalities:

a.) On page 4, line 21; examiner suggests applicant replace the word **"in"** with **"into"**.

b.) On page 6, lines 13-20 are unclear. Examiner suggests applicant rewrite for clarity.

c.) On page 22, line 4, applicant's symbols are unclear.

d.) On page 29, lines 10-12, "This selecting ..... received signal power. " are unclear. Examiner suggests applicant rewrite for clarity.

Appropriate correction is required.

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1- 4, 10, 13, 14 16, 28- 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Agee (US Patent 6,128,276).

(1) With regard to claim 1, Agee discloses in Fig. 1, a method of transmitting data signals from a transmitting terminal with each at least one transmitting means (12, 13, etc.) to at least one receiving terminal with a spatial diversity receiving means (11) comprising: transmitting from the transmitting terminal transformed data signals, being transformed versions of the data signals (col. 3, lines 20-39; col. 30, lines 49-67); receiving on the spatial diversity means received data signals being at least function of at least two of the transformed data signals; subband processing of at least two of the received data signals in the receiving terminal (col. 34, lines 64-67; col. 35, lines 1-18) ; and determining estimates of the data signals from subband processed received data signals in the receiving terminal (col. 15, lines 6-14).

(2) With regard to claim 2, Agee also discloses wherein the transmitting is substantially simultaneous (col. 32, lines 22-25).

(3) With regard to claim 3, Agee also discloses wherein the spectra of the transformed data signals are at least partly overlapping (col. 32, lines 36-40).

(4) With regard to claim 4, Agee also teaches wherein determining the estimates of the data signals in the receiving terminal is determined on a sub band by sub band basis (col. 35, lines 35-40).

(5) With regard to claim 10, Agee also discloses wherein the subbands, being involved in the subband processing; are grouped into sets, at least one set comprising at least two subbands; and wherein determining the estimates of the data signals in the receiving terminal comprises: determining relations between the data signals and subband processed received data signals on a set-by-set basis; and exploiting the relations between the data signals and the subband processed received data signals for determining the data signals (col. 39, lines 38-57; col. 40, lines 1-55).

(6) With regard to claim 13, Agee also discloses wherein the transformation of the data signals to transmitted data signals further comprises guard interval introduction (col. 36, lines 51-60).

(7) With regard to claim 14, Agee also discloses wherein the subband processing comprises orthogonal frequency division demultiplexing (col. 10, lines 56-60).

(8) With regard to claim 16, Agee also wherein the determining of combined data signals is essentially based on the distinct spatial signatures of the received data signals (col. 31, lines 3-8).

(9) With regard to claim 28, claim 28 inherits all limitations of claim 1.

(10) With regard to claim 29, claim 29 inherits all limitations of claim 28. Furthermore, Agee also discloses in Figs. 8-12 wherein the circuitry is arranged for determining estimates of the data signals from subband processed received data signals and comprises a plurality of circuits each being arranged for determining part of the estimates of the data signals based on part of the subbands of the subband processed received data signals.

(11) With regard to claim 30, Agee also discloses in Figs. 8-12, 28, wherein the spatial diversity means comprises at least two receiving means and the circuitry is arranged for receiving the received data signals with the spatial diversity means and comprises a plurality of circuits each being arranged for receiving the received data signals from one of the receiving means of the spatial diversity means.

(12) With regard to claim 31, claim 31 inherits all limitations of claims 16 and 28.

(13) With regard to claim 32, claim 32 inherits all limitations of claims 4 and 28.

7. Claims 17-20, 25, 33-36, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Julian et al. (GB 2 324 932 A).

(1) With regard to claim 17, Julian et al. discloses in Fig. 5, a method of transmitting data signals from at least one transmitting terminal (112) with a spatial diversity transmitting means to at least two receiving terminals with at least one receiving means comprising (116): determining combined data signals in the transmitting terminal, the combined data signals being transformed versions of the data signals (pg. 13, lines 7-21); inverse subband processing the combined data signals (pg. 6, lines 18-21); transmitting with the spatial diversity means inverse

subband processed combined data signals; receiving on at least one of the receiving means of at least one of the receiving terminals inverse subband processed received data signals, being at least function of the inverse subband processed combined data signals; and determining estimates of the data signals from the inverse subband processed received data signals (pg. 8, lines 18-34).

(2) With regard to claim 18, Julian et al. also teaches wherein the transmitting of inverse subband processed combined data signals is substantially simultaneous (pg. 9, lines 16-25).

(3) With regard to claim 19, Julian et al. teaches an OFDM scheme (abstract). It is well known in the art that OFDM increases the overall spectral efficiency by overlapping.

(4) With regard to claim 20, Julian et al. also teaches wherein determining combined data signals in the transmitting terminal is determined on a subband by subband basis (pg. 7, lines 7-18).

(5) With regard to claim 25, claim 25 inherits all limitations of claim 17. Furthermore, Julian et al. also discloses wherein the subbands, being involved in inverse subband processing, are grouped into sets, at least one set comprising at least two subbands; and wherein determining combined data signals in the transmitting terminal comprises: determining relations between the data signals and the combined data signals on a set-by-set basis; and exploiting the relations between the data signals and the combined data signals for determining the data signals (pg. 8, lines 18-34).

(6) With regard to claim 33, claim 33 inherits all limitations of claim 17.

(7) With regard to claim 34, claim 34 inherits all limitations of claim 33. Furthermore, Julian et al. also discloses wherein the circuitry being adapted for combining data signals

comprising a plurality of circuits each being adapted for combining data signals based on part of the subbands of the data signals (pg. 12, lines 32-37).

(8) With regard to claim 35, Julian et al. also discloses wherein the spatial diversity transmitting means comprises at least two transmitting means and the circuitry being adapted for transmitting inverse subband processed combined data signals comprises a plurality of circuits each being adapted for transmitting the inverse subband processed combined data signals with one of the transmitting means of the spatial diversity means (pg. 12, lines 1-16).

(9) With regard to claim 36, claim 36 inherits all limitations of claims 19 and 33.

(10) With regard to claim 38, claim 38 inherits all limitations of claims 20 and 33.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 5, 6, 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agee (US Patent 6,128,276) as applied to claim 1 above in view of Chennakeshu et al. (US Patent 6, 137,843).

(1) With regard to claim 5, as noted above, Agee discloses all limitations of claim 1.

However, Agee does not disclose wherein determining the estimates of the data signals from subband processed received data signals in the receiving terminal further comprises for at least one data signal: selecting from the data signals a selected data signal; determining an estimate of the selected data signal from the subband processed received data signals; modifying the subband processed received data signals based on the estimate of the selected data signal; and determining estimates of the remaining data signals from the modified subband processed received data signals.

However, Chennakeshu et al. teaches determining the estimates of the data signals from subband processed received data signals in the receiving terminal further comprises for at least one data signal: selecting from the data signals a selected data signal; determining an estimate of the selected data signal from the subband processed received data signals; modifying the subband processed received data signals based on the estimate of the selected data signal; and determining estimates of the remaining data signals from the modified subband processed received data signals (col. 4, lines 5-39).

One skilled in the art would have clearly recognized that determining the estimates of the data signals from subband processed received data signals in the receiving terminal further comprises for at least one data signal: selecting from the data signals a selected data signal; determining an estimate of the selected data signal from the subband processed received data signals; modifying the subband processed received data signals based on the estimate of the selected data signal; and determining estimates of the remaining data signals from the modified subband processed received data signals is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of

invention to apply the method as taught by Chennakeshu et al. to the invention of Agee as a method of enhancing receiver performance in the presence of adjacent channel interference.

(2) With regard to claim 6, Chennakeshu et al. also discloses wherein selecting a data signal is based on the receiving power of the data signals (col. 7, lines 5-67).

(3) With regard to claim 7, although Chennakeshu et al. also does not explicitly disclose the selection of a data signal based on the interference ratio of the data signals, he does disclose determining which of the signals is largest by two methods (col. 7, lines 5-67). It is well- known in the art that the SNR can be used for this determination.

(4) With regard to claim 8, Chennakeshu et al. also discloses wherein determining the estimates of the data signals from subband processed received data signals in the receiving terminal further comprises for at least one data signal: selecting from the data signals a selected data signal; determining a plurality of estimates of the selected data signal from the subband processed received data signals; determining a plurality of modified subband processed received data signals, each of the modified subband processed received data signals being based on one of the estimates of the selected data signal; determining a plurality of estimates of at least one of the remaining data signals from the plurality of modified subband processed received data signals; and thereafter selecting one of the estimates of the selected data signal (col. 4, lines 5-39).

(5) With regard to claim 9, Chennakeshu et al. also discloses wherein selecting a data signal is based on the interference ratio of the data signals (col. 7, lines 57-67).

10. Claims 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Agee (US Patent 6,128,276) as applied to claim 1 above in view of Yamatoto (EP 0 975 101 A2).

(1) With regard to claim 11, as noted above, Agee discloses all limitations of claim 1. Agee does not however disclose wherein the transformation of the data signals to transformed data signals comprises inverse subband processing.

However, Yamatoto teaches wherein the transformation of the data signals to transformed data signals comprises inverse subband processing (paragraph 0012).

One skilled in the art would have clearly recognized that a method of transmitting wherein the transformation of the data signals to transformed data signals comprises inverse subband processing is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply the method as taught by Yamatoto as a method for allowing selective diversity of individual sub carriers of an OFDM modulated signal.

(2) With regard to claim 12, Yamatoto also teaches wherein determining estimates of the data signals from subband processed received data signals in the receiving terminal comprises: determining intermediate estimates of the data signals from the subband processed received data signals in the receiving terminal; and obtaining the estimates of the data signals by inverse subband processing the intermediate estimates (paragraphs 0022-0026).

(3) With regard to claim 15, Agee also discloses wherein subband processing comprises orthogonal frequency division multiplexing (col. 10, lines 55-60).

11. Claims 21, 23, 24, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Julian et al. (US Patent GB 2 324 932 A) as applied to claim 17 above in view of Kaiser et al. (US Patent 6,188,717 B1).

As noted above, Julian et al. discloses all limitations of claim 17. He does not however disclose wherein determining the estimates of the data signals in the receiving terminals comprises subband processing.

However, Kaiser et al. teaches wherein determining the estimates of the data signals in the receiving terminals comprises subband processing (col. 8, lines 55-63).

One skilled in the art would have clearly recognized that wherein determining the estimates of the data signals in the receiving terminals comprises subband processing lines is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply the method as taught by Kaiser et al. to the invention of Julian et al. to incorporate a method of high spectral efficiency available for use on both the up and down link of cellular radio (col. 3, lines 6-53).

(2) With regard to claim 23, Kaiser et al. also teaches wherein the subband processing is orthogonal frequency division demultiplexing (col. 6, lines 40-53).

(3) With regard to claim 24, Kaiser et al. also teaches wherein the inverse subband processing is orthogonal frequency division multiplexing (col. 8, lines 55-63).

(4) With regard to claim 26, claim 26 inherits all limitations of claim 17, Furthermore, Kaiser et al. also teaches wherein in the inverse subband processed combined data signals a guard interval is introduced (col. 8, lines 5-17).

12. Claims 27 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Julian

et al. (GB 2 324 932) as applied to claims 17 and 33 above in view of Agee (US Patent 6,128,276).

(1) With regard to claim 27, claim 27 inherits all limitations of claim 17. As noted above Julian et al., discloses all limitations of claim 17. Julian does not however disclose wherein the determining of combined data signals is essentially based on the distinct spatial signatures of the transmitted inverse subband processed combined data signals.

However, Agee discloses wherein the determining of combined data signals is essentially based on the distinct spatial signatures of the received data signals (col. 31, lines 3-8).

One skilled in the art would have clearly recognized that a method of transmitting wherein the determining of combined data signals is essentially based on the distinct spatial signatures of the received data signals is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply the method as taught by Agee to the invention of Julian et al. as a method of determining the downlink weights.

(2) With regard to claim 37, claim 37 inherits all limitations of claims 27 and 33.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Agee et al. discloses in U. S. Patent 6,359,923 B1 highly bandwidth efficient communications.

b. Masao et al. discloses in JP 2003-023381a transmitting site diversity system.

c. Henriksson discloses in Pub. No.: US 2002/0021773 A1 a diversity receiver.

d. Li et al. discloses in Pub. No.: US 2002/0053143 A1 an MIMO OFDM system.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 703-305-6969. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Lawrence B. Williams

lbw
June 13, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600